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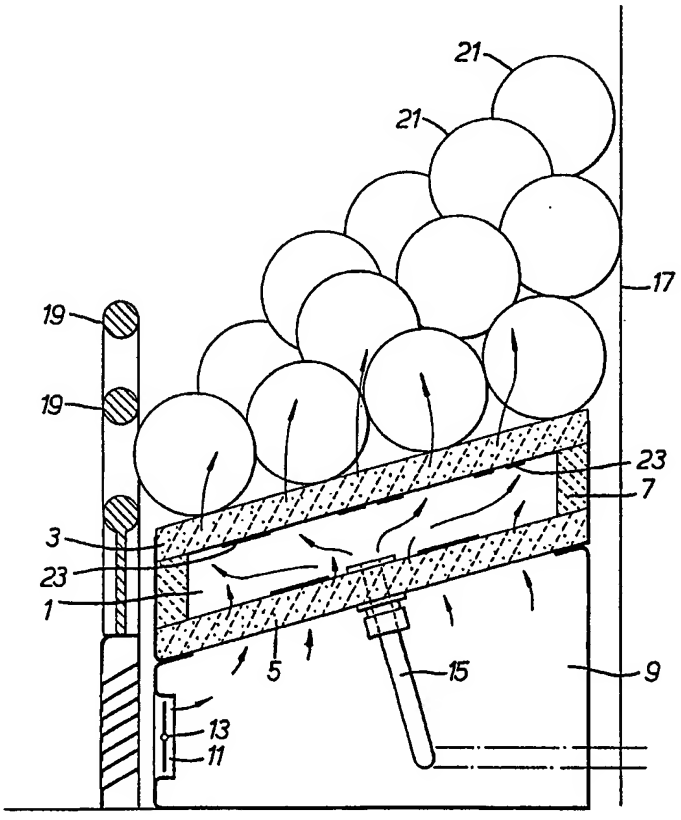
(54) **Solid fuel effect gas fires**

(57) A gas fired appliance which simulates a solid-fuel burning heating appliance has a plurality of refractory bodies 21 which are shaped and coloured to represent solid fuel mounted on a porous plate 3 which constitutes the top of an enclosure 1. Gas and air are supplied separately to the enclosure but in such a manner that they do not mix uniformly within the enclosure. In this way, the gas/air mixture which passes through the porous plate and is burnt in a non-uniform mixture and some luminous and some non-luminous flames are produced.

As shown, the air enters the enclosure 1 through a porous bottom plate 5 and areas of both plates 5 and 3 are masked as at 23 to close off the pores and thereby provide non-uniform air supply into the enclosure and non-uniform supply of gas/air mixtures into the simulated solid fuel bed respectively.



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The drawing originally filed was informal and the print here reproduced is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1982

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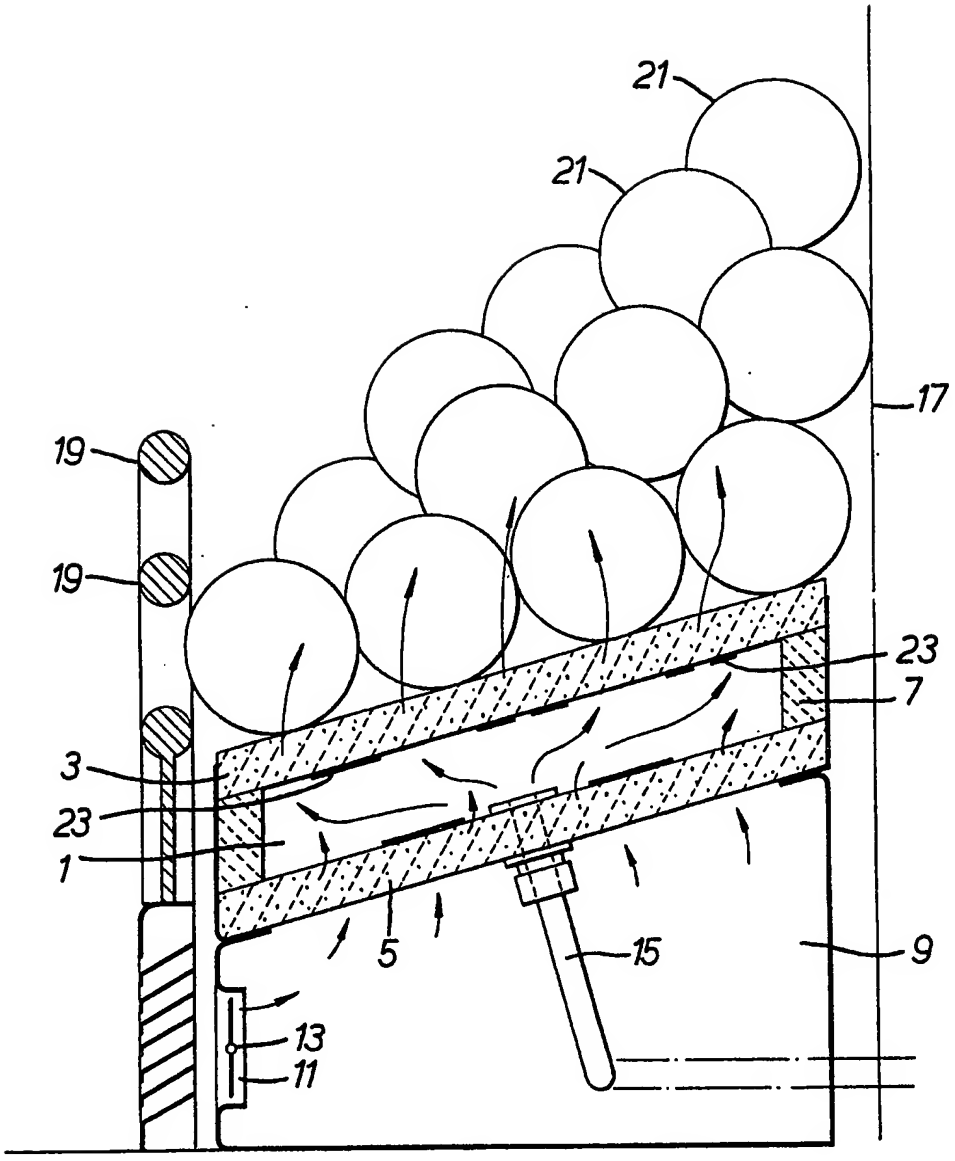

SPECIFICATION

Gas fire

This invention relates to heating appliances which burn gaseous fuel but which simulate solid-fuel burning appliances.

Such simulated solid-fuel burning heating appliances usually include a mass of particulate refractory material in an open topped tray, a plurality of refractory bodies, shaped and coloured to simulate solid fuel, mounted on the top of the mass of particulate refractory material, and means for introducing gaseous fuel into the mass of particulate refractory material, such that it percolates up through the material into spaces between the bodies where it is burnt.

It is most important with such heating appliances for the appearance of the burning fuel to realistically simulate a solid-fuel fire. To this end, it is desirable that there is a mixture of luminous and non-luminous flames since, when a conventional solid-fuel burning appliance is in use, a mixture of luminous and non-luminous flames are produced.

It is an object of the present invention to provide a simulated solid-fuel burning heating appliance which, in use, has a mixture of luminous and non-luminous flames and, consequently, is very realistic of a solid-fuel appliance.

According to the present invention, a simulated solid-fuel burning heating appliance comprises a plurality of refractory bodies, shaped and coloured to simulate solid fuel, mounted on a porous plate which constitutes the top of an enclosure, means for introducing gas and air separately into the enclosure and in such a manner as to ensure that uniform mixing of the gas and the air in the enclosure does not occur.

In use, the gas and air supplied to the chamber are mixed in the chamber, but not uniformly mixed, and the gas/air mixture leaves the chamber through the upper porous plate. Because the gas and air have not thoroughly mixed within the chamber, the mixture which percolates through one region of the upper plate will have a different gas/air mix from the mixture which percolates through another region of the plate. On the upper surface of the plate, the mixture which contains an adequate air supply will burn with hard hot short blue flames while the gas mixture which is short of air will burn with cool long yellow flames. The hard short blue flames will cause the refractory bodies to glow in the manner associated with a real solid-fuel fire.

In one embodiment of the invention, the bottom wall of the enclosure is provided by a porous plate and the porosity of the lower plate may be adjusted over its surface so that air percolating through this plate into the enclosure is not uniformly distributed over the area of the lower plate.

In order that the invention may be more readily understood, it will now be described, by way of example only, with reference to the accompanying drawing which is a schematic sectional side elevation of a gas fire in accordance with the present invention.

A gas fire, which simulates a solid-fuel burning heating appliance, has an enclosure 1 defined by an upper plate 3, a lower plate 5 and a spacer member 7 which extends around the periphery of the two plates to separate them and, hence, define the hollow enclosure 1. The lower plate is mounted upon a sheet metal hollow housing 9 having an inlet 11 on its front wall with a control mechanism 13 for controlling the amount of air allowed to enter into the housing. A gas inlet pipe 15 extends through the housing and through an opening in the lower plate 5 into the enclosure 1. The plates constituting the enclosure 1 and the housing 9 are mounted in a fireplace having a back plate 17 and separated bars 19 constituting the front of the fireplace. Mounted on the upper surface of the plate 3 there are a plurality of bodies of refractory material 21 which are shaped and coloured to simulate solid-fuel, such as coals, or logs.

In use, gas is introduced through the pipe 15 into the enclosure 1. With natural gas, which is lighter than air, the gas tends to permeate upwards through the upper porous plate, where it is ignited on the upper surface thereof. This generates a slight suction, causing air to be drawn up through the lower porous plate 5 into the enclosure 1. In the case of propane or other fuel gas which is heavier than air, the combustion of the fuel gas on the upper surface of the plate 3 induces the fuel gas upwards and this, in turn, induces air through the lower plate into the chamber. In order to provide the required variation in the types of flames which are produced on the upper surface of the plate, the degree of air and gas mixing in the enclosure is deliberately made non-uniform in order to produce a near random combustion flame profile. This gives rise to respective parts of the fire having hard blue flames and parts with lazy attractive yellow lambent flames. On impinging on the simulated solid-fuel elements, the hot flames cause these elements to become effective radiants, while the yellow flames meander through the spaces between the fuel elements to provide the desired appearance of a solid-fuel burning fire.

The porosity of the upper plate can be adjusted to alter the regions of the plate through which air/gas mixture diffuses. To this end, areas on the underside of the plate 3 are masked to close off the pores, as indicated by reference numeral 23. To this end, the masking may be provided by painting the underside of parts of the plate in order to close off the pores therein, or by applying some form of layer to parts of the surface of the plate in order to mask off certain areas thereof. In this way, the gas/air mixture does not pass evenly through the upper plate but passes through the unmasked areas only.

To ensure that the air supply into the enclosure 1 is not uniform over the entire area of the bottom plate, parts of the surface of this plate may also be masked off by appropriate paint, or other masking

material, so that the air does not enter the enclosure uniformly over the entire surface of the lower plate.

Inside the enclosure, air and gas mixing takes place, but in a most non-uniform manner, that is, in some parts of the enclosure the proportions of gas and air will be very different from the proportions present in other parts of the enclosure.

Normally, one would seek to have the lambent yellow flames towards the front of the fire and to allow high temperatures to develop at the centre and at the back of the fire to enhance not only radiation forwards into the room, but also backwards on to a heat reflective surface 17, or heat recovery equipment in the form of a boiler or warm air convector (not shown).

It is essential that the upper plate porosity is high so that all gaseous fuel passes upwards and there is no likelihood of the gas mixture attempting to percolate downwardly through the lower plate. The upper plate may be inclined, as shown in the figure, so that the upper surface can radiate effectively forwards into the room in which the fire is in use.

As the upper plate becomes hot while it is in use, it does provide a degree of heating to the gas/air mixture as it percolates therethrough, and this will increase the overall thermal radiation efficiency.

If desired, some form of distributor plate may be mounted in the enclosure above the outlet of the tube 15 in order to cause the gas leaving the outlet to be dissipated sideways and thereby more effectively mix with the air in the enclosure.

It may be found that it is desirable to introduce one more means defining at least one air passage for providing extra combustion air to the mixture flowing to some of the spaces between the refractory bodies 21. To this end, one or more tubes may pass upwardly into the space between some of the refractory bodies 21 in order to introduce more air into the spaces. The tubes may pass directly through the enclosure 1 with their lower ends in the housing 9.

The plate 3 and the lower plate 5, when it is of a porous material, may be formed of porous ceramic materials, or they may be of a woven ceramic material with a metal reinforcement, or alternatively they may be entirely of metal taking the form of finely expanded metal sheeting.

In an alternative embodiment of the invention, the plate 5 may simply comprise a gauze arranged to act as a flame trap and prevent flames entering the housing 9.

In another embodiment, the top of the hollow housing 9 may comprise a porous plate and the refractory "coals" are supported on the upper surface of this plate.

Gas and air are introduced separately into the housing, perhaps the gas more to the front of the housing and the air more to the back of the housing. In this way, air-starved gas percolates through the front of the plate and gas with excess air percolates through the rear of the plate.

CLAIMS

1. A simulated solid-fuel burning heating appliance comprising a plurality of refractory bodies shaped and coloured to simulate solid-fuel mounted on a porous plate which constitutes the top of an enclosure and means for introducing gas and air separately into the enclosure in such a manner as to ensure that uniform mixing of the gas and air in the enclosure does not occur.

2. An appliance as claimed in claim 1, in which an additional porous plate constitutes another part of the enclosure and the air is introduced into the enclosure through said additional porous plate.

3. An appliance as claimed in claim 2, in which the additional plate constitutes the bottom of the enclosure and said plates are spaced apart by side walls.

4. An appliance as claimed in claim 2 or 3, in which the passage of air through the additional plate is non-uniform over the surface of the plate.

5. An appliance as claimed in claim 4, in which the additional plate is of a material of substantially uniform porosity but with the pores of certain areas of the plate blocked off.

6. An appliance as claimed in claim 5, in which the additional plate is of a ceramic material.

7. An appliance as claimed in any preceding claim in which the passage of air/gas through the plate which constitutes the top of the enclosure is non-uniform over the surface of the plate.

8. An appliance as claimed in claim 7, in which the pores of certain areas of the plate are blocked off.

9. An appliance as claimed in any preceding claim, in which gas is introduced into the enclosure by way of a pipe leading to the enclosure.

10. An appliance as claimed in any preceding claim, in which at least one tube extends upwardly into the plurality of refractory bodies to provide additional air to some of the spaces between the refractory bodies.

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